DEEP SPACE/LUNAR CALIBRATION STUDY STATUS

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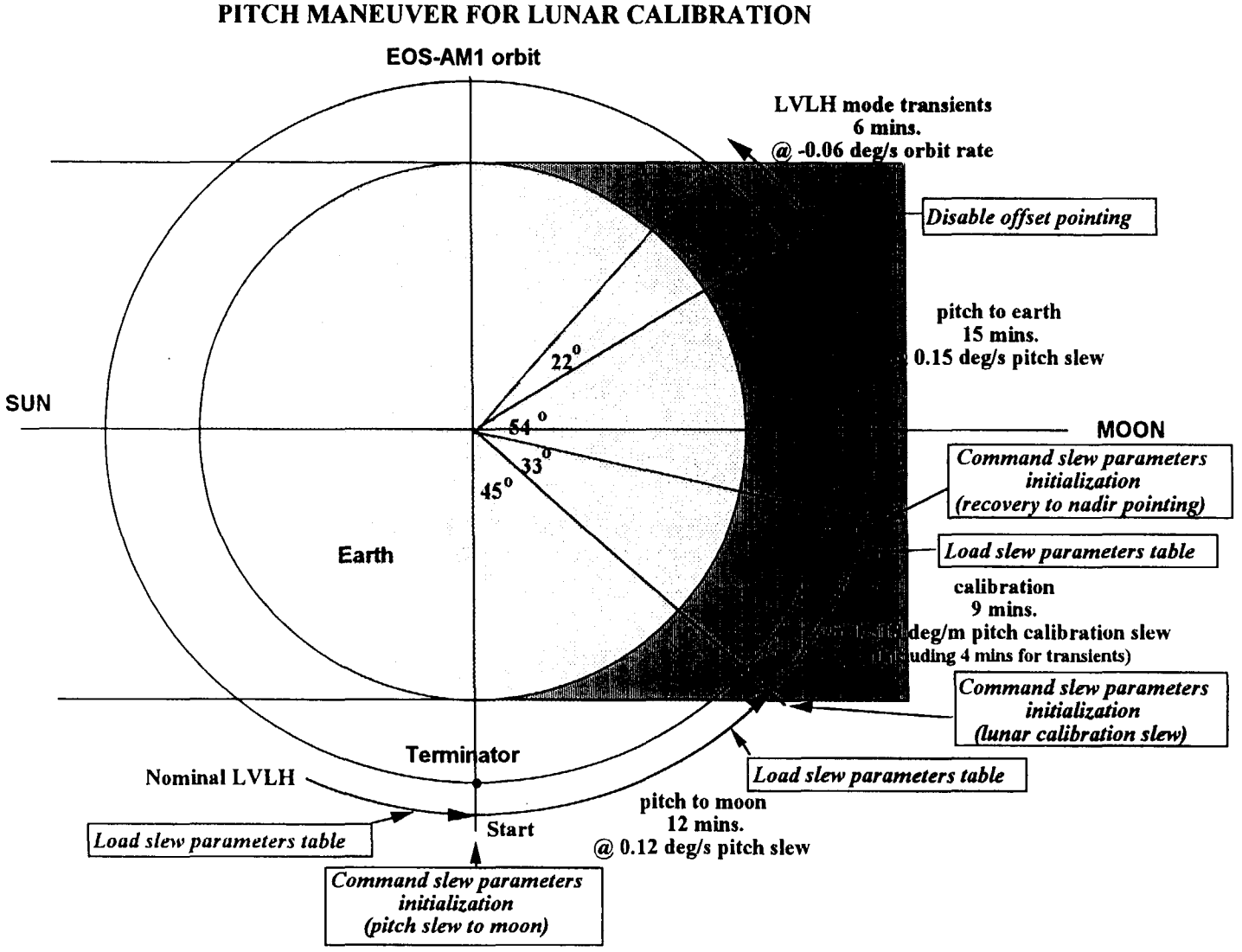
ACCOMPLISHMENTS

- MANEUVERS DEFINED
- GN&C FEASIBILITY STUDY COMPLETED
- GN&C CONTINGENCY STUDY OF FAILED REACTION WHEEL COMPLETED
- MODIS COLD FOCAL PLANE ASSEMBLY (CFPA) THERMAL ANALYSIS COMPLETED
- PRELIMINARY TABLE LOAD AND COMMAND SEQUENCE DEFINED

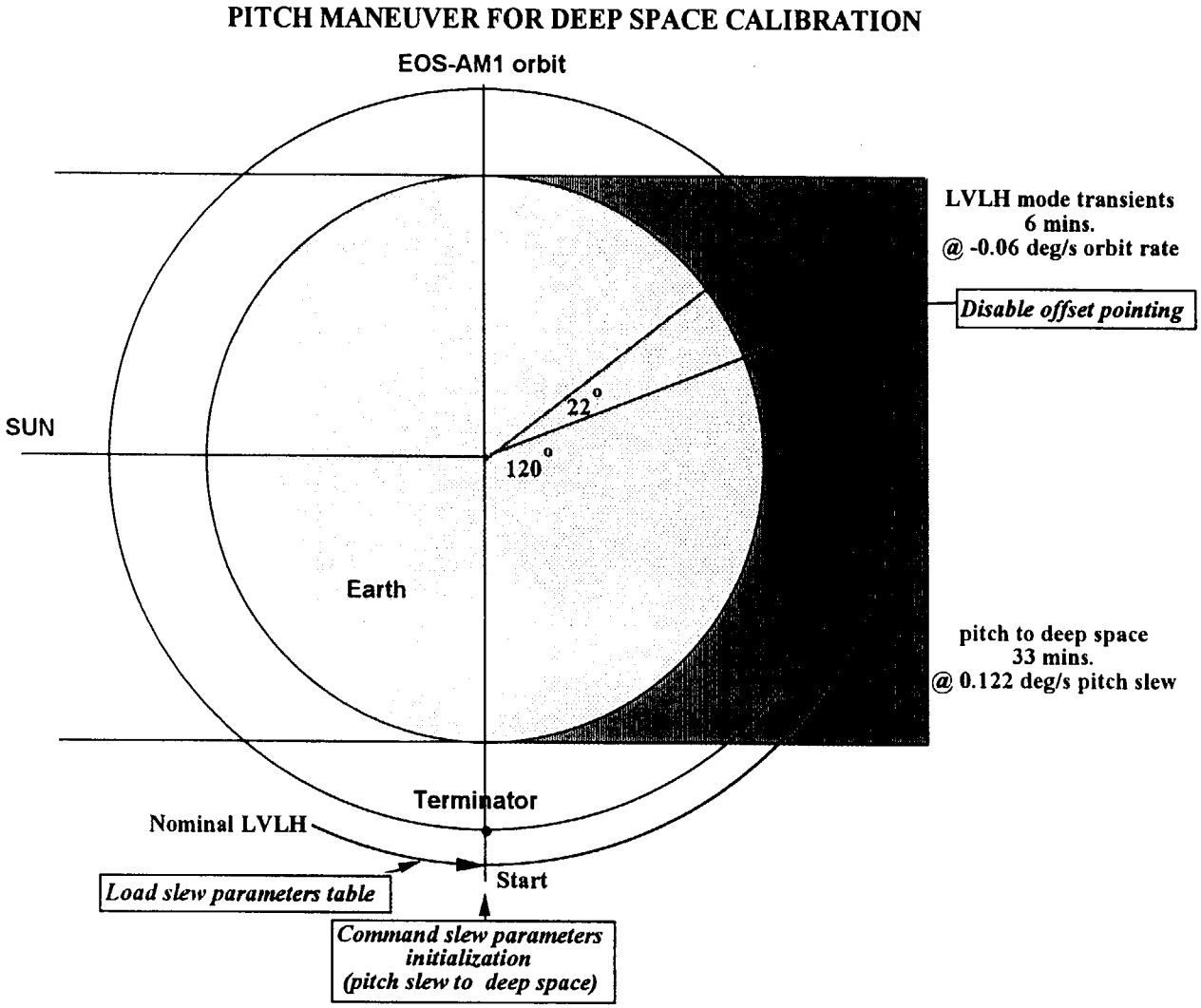
MANEUVERS PROPOSED FOR EARLY PHASE OF MISSION

- RECOMMENDED BY THE SWAMP TO SUPPORT INSTRUMENT CALIBRATION AND CHARACTERIZATION
- TWO MANEUVERS BEING EVALUATED
  - MULTIPLE PITCH RATE DEEP SPACE CALIBRATION
    - THREE COMMANDED PITCH RATES: ALLOWS FOR SLOWER RATE WHEN VIEWING THE MOON
  - CONSTANT PITCH RATE DEEP SPACE CALIBRATION
    - CONSTANT PITCH RATE: NO SLOWED SCAN ACROSS MOON
    - ALLOWS FLIGHT OPERATIONS TEAM (FOT) AND S/C ENGINEERS TO EVALUATE THE MANEUVER PROCEDURES AND TO TRAIN FOR FUTURE ONES

MULTIPLE PITCH RATE DEEP SPACE CALIBRATION MANEUVER



CONSTANT PITCH RATE DEEP SPACE CALIBRATION MANEUVER



DEFINED MANEUVERS MEET ALL REQUIREMENTS

REQUIREMENT	PERFORMANCE
• COMPLETE MANEUVER IN ECLIPSE	• COMPETED WITH 6 MIN MARGIN
• ACHIEVE DEEP SPACE VIEW • (84° FROM NADIR) WITHIN 9 MIN	• DEEP SPACE VIEW ACHIEVED WITHIN 8 MIN
• MODIS CFPA BACK TO CALIBRATION RANGE WITHIN 24 HRS	• MODIS FOCAL PLANE AT 83K WITHIN 22 HRS (PER GSFC ANALYSIS)
• S/C PITCH-ONLY MANEUVER	• TWO-AXIS MANEUVER NOT NEEDED
• LUNAR VIEW WITHIN 20 MIN	• LUNAR VIEW WITHIN 17 MIN
• NADIR VIEWS MOON AT 0.518°/MIN UNIFORM RATE (MULTI-PITCH RATE MANEUVER ONLY)	• RATE ERROR DURING MANEUVER IS 0.01°/MIN (MULTI-PITCH RATE MANEUVER ONLY)

GN&C STUDY SUMMARY

- ALL REQUIREMENTS ARE ACHIEVED WITH A NOMINALLY OPERATING SPACECRAFT (4 REACTION WHEELS AVAILABLE)
- MULTI-PITCH RATE MANEUVER REQUIREMENTS CANNOT BE ACHIEVED WITH A FAILED REACTION WHEEL. LVLH NOT ACHIEVED AT END OF MANEUVER.
- ANALYSIS SHOWS THAT REACTION WHEELS SATURATE DURING THE CONSTANT PITCH RATE MANEUVER WITH THREE REACTION WHEELS
- INVESTIGATION OF EXISTING FLIGHT CODE INDICATES THAT THE MANEUVER CAN BE PERFORMED WITHOUT SOFTWARE MODIFICATIONS. HOWEVER, FOR THE MULTIPLE PITCH RATE MANEUVER, THE PROCEDURE IS VERY GROUND COMMAND INTENSIVE.

FUTURE/CONTINUING EFFORTS

- COMPLETE TDRSS COVERAGE ANALYSIS
- COMPLETE SPACECRAFT THERMAL ANALYSIS
- DEVELOP MANEUVER OPERATIONS PROCEDURES. TEST/SIMULATE COMMANDS AND TABLE LOADS.
- PERFORM SAFE MODE ENTRY ANALYSIS
- PERFORM FAILURE DETECTION LOGIC ARCHITECTURE TRADE STUDY
- LOCKHEED MARTIN TO VERIFY MANEUVER AND ASSOCIATED ANALYSES
- TRANSFER RESPONSIBILITY FOR THE MANEUVER TO THE FOT FOLLOWING THE STUDY PHASE